ABSTRACT OF THE DISCLOSURE

Disclosed herein are (1) a light-emitting semiconductor device that uses a gallium nitride compound semiconductor ($Al_XGa_{1-X}N$) in which the n-layer of n-type gallium nitride compound semiconductor ($Al_XGa_{1-X}N$) is of double-layer structure including an n-layer of low carrier concentration and an n^+-layer of high carrier concentration, the former being adjacent to the i-layer of insulating gallium nitride compound semiconductor ($Al_XGa_{1-X}N$); (2) a light-emitting semiconductor device of similar structure as above in which the i-layer is of double-layer structure including an i_L-layer of low impurity concentration containing p-type impurities in comparatively low concentration and an i_H-layer of high impurity concentration containing p-type impurities in comparatively high concentration, the former being adjacent to the n-layer; (3) a light-emitting semiconductor device having both of the above-mentioned features and (4) a method of producing a layer of an n-type gallium nitride compound semiconductor ($Al_XGa_{1-X}N$) having a controlled conductivity from an organometallic compound by vapor phase epitaxy, by feeding a silicon-containing gas and other raw material gases together at a controlled mixing ratio.